

# EXAMPLES OF EPA LEAD CLEANUPS

AUGUST 2016



Region 3 • Region 7 • Region 9 • Region 10

This fact sheet serves as an overview of several lead cleanups conducted or overseen by the U.S. Environmental Protection Agency (EPA). Though the cleanup efforts detailed in the following pages are not inclusive of all lead cleanups completed by EPA, they do illustrate the range in cost, duration, and process typical of major lead cleanup efforts.

The EPA Superfund program can address lead cleanups as either **removal** or **remedial** actions. Removal actions are immediate, short-term responses intended to protect people from imminent health threats, while remedial actions are long-term cleanups designed to prevent or minimize the release of hazardous substances and to reduce the risk and danger to public health or the environment. At some sites, a

cleanup might begin under removal authority and then transition into a remedial action as cleanup efforts progress.

Additionally, the following examples include cleanups conducted at both **Superfund** sites and sites with **Superfund Alternative Approach** agreements. As a point of clarification, Superfund sites are sites that are listed on the National Priorities List (NPL), which is EPA's list of hazardous waste sites eligible for long-term remedial action under the federal Superfund program. Sites with Superfund Alternative Approach agreements are sites with private responsible parties (e.g., a mining company) that have signed an agreement with EPA to clean up the site to the same standards to which it would be cleaned up to if it were listed on the NPL.





### Price Battery Superfund Site, Pennsylvania

The Price Battery Superfund site is located in the Borough of Hamburg, Berks County, Pennsylvania, and consists of the former Price Battery manufacturing facility, adjacent residential areas, and other nearby contaminated areas. The facility went through several transfers of ownership but was acquired by Exide Technologies Inc. in 1987. Exide ceased manufacturing at the site in 1995. Site contamination was caused by aerial dispersion of historic emissions from the Price lead smelting facility. In addition, lead-contaminated battery wastes and casings were used as fill material throughout the Borough of Hamburg and surrounding vicinity. The cleanup was completed using both removal authority and remedial action. In addition to excavating and removing contaminated soils in yards during the cleanup, EPA also cleaned up the interiors of properties that had exterior lead contamination above the cleanup levels of 572 ppm and interior lead dust levels on floors above 40 µg/ft<sup>2</sup>. Sheldon Mine: May 2013 (\$960,000)

- ◆ **Cleanup Duration:** The remedial action at the site lasted approximately 3 years. There was no pause in residential cleanup activities between the removal and remedial actions.
- ◆ **Cleanup Level:** 572 ppm
- ◆ **Number of properties cleaned up:** In total, EPA cleaned up the yards of 555 properties. In addition, the interiors of 402 properties were cleaned.
- ◆ **Lead levels prior to cleanup:** Lead levels prior to cleanup generally ranged between 500 ppm to a few thousand ppm. However, lead levels in some yards next to the former smelter were found to have lead levels greater than 100,000 ppm.
- ◆ **Total Cost:** Approximately \$30 million for the combined Removal / Remedial Action costs.
- ◆ **EPA Contact:** John Banks, [banks.john-d@epa.gov](mailto:banks.john-d@epa.gov)
- ◆ **Site Page:** <https://cumulis.epa.gov/supercpad/cursites/csitinfo.cfm?id=0305679>





### omaha Lead Superfund Site, nebraska

The Omaha Lead Superfund Site includes surface soils present at residential properties, child-care centers, and other residential-type properties in the City of Omaha, Nebraska that were contaminated as a result of deposition of air emissions from historic lead smelting and refining operations. At the site, about one out of three residential yards have lead in the soil at concentrations above the health-based limit of 400 parts per million (ppm). During the lead cleanup, EPA removed contaminated soil in 6" lifts to reach lead concentrations below 400 ppm or a depth of 12" in yards and two feet in depth in gardens (where produce would be grown for consumption).



- ◆ **Cleanup Duration:** EPA's cleanup of residential yards began in 1999 and was completed on December 31, 2015. The City of Omaha, under a cooperative agreement of \$31 million with EPA, will continue to try to gain access at a few hundred yards where EPA has not yet been able to obtain property owner permission to sample and do cleanup work.
- ◆ **Cleanup Level:** 400 ppm
- ◆ **Number of properties cleaned up:** In total, EPA cleaned up approximately 13,000 yards and sampled 40,000 yards
- ◆ **Lead levels prior to cleanup:** Many yards had lead levels of over 2,500 ppm. EPA cleaned up these yards with highest levels first and ultimately cleaned up all yards with levels over 400 ppm.
- ◆ **Total Cost:** \$309 million
- ◆ **EPA Contact:** Steve Kemp, [kemp.steve@epa.gov](mailto:kemp.steve@epa.gov)
- ◆ **Site Page:** <https://cumulis.epa.gov/supercpad/cursites/csitinfo.cfm?id=0703481>



## Asarco Hayden, Arizona

The Asarco Hayden residential yard cleanup in Hayden and Winkelman, AZ was completed as a company-led project overseen by EPA. Lead contamination at the site originated from historic mine and smelter operations. Site contamination included arsenic, copper, and lead. To date, this is the biggest residential yard removal project overseen by EPA Region 9, though it will likely soon be surpassed by other sites (such as Eureka, NV). Asarco Hayden has a Superfund Alternative Approach agreement.

- ◆ **Cleanup Duration:** The cleanup lasted from December 2008 to December 2009. This included yard sampling and significant mobilization and demobilization time.
- ◆ **Cleanup Level:** 400 ppm
- ◆ **Number of properties cleaned up:** 266 parcels were cleaned up, and 800 parcels were sampled.
- ◆ **Lead levels prior to cleanup:** The cleanup cutoff was 400 ppm, and the highest lead level identified during sampling was about 1,500 ppm.
- ◆ **Total Cost:** \$8 million
- ◆ **EPA Contact:** John Hillenbrand, [hillenbrand.john@epa.gov](mailto:hillenbrand.john@epa.gov)
- ◆ **Site Page:** <http://www.epa.gov/superfund/asarcohaydenplant>







## eureka Smelter Site, nevada

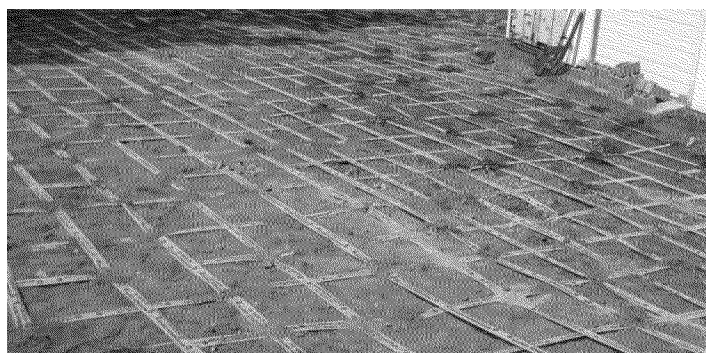
The residential yard cleanup in Eureka, NV is ongoing and addresses lead contamination originating from historic smelting operations in the area. During the 2016 field season, which was initiated in May 2016, EPA plans to construct a repository for permanent storage of contaminated soil from residential yard cleanups, clean up approximately 50 additional residential properties, and cover one of the hillsides on the site that has very high levels of contamination. The cost of field work for the 2016 season is anticipated to be \$4-5 million. Blood lead testing is completed at the site by partnering with Nevada Division of Environmental Protection (NDEP) and the County Rural Health Unit. The Eureka Smelter site was addressed as a removal action.

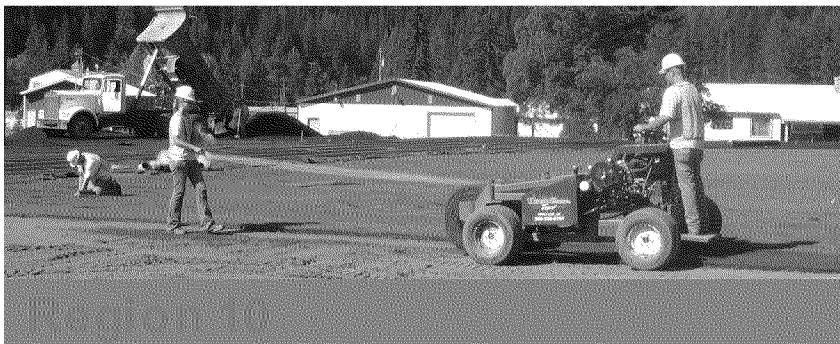
## West oakland Residential Lead Cleanup, California

The West Oakland Residential Lead Cleanup was completed in an urban neighborhood in Oakland, CA with lead contamination in yards originating from several sources, including historic industrial services used to support the railroad, leaded gasoline due to the area's proximity to several freeways, and lead-containing household items that were likely buried in yards. The lead cleanup in West Oakland used phosphate immobilization with fish bones as an in-situ treatment to address lead found in soil. The use of phosphate immobilization was widely supported by the community as a way to reduce the amount of excavation needed during cleanup and therefore limit the number of trucks, excavators, and other large vehicles that would enter the community. During the West Oakland lead cleanup, the contaminated soil was removed and disposed of up to 6 inches in depth. Fish bones were then mixed in with the next foot of contaminated soil for phosphate immobilization. This was then capped with six inches of clean, uncontaminated soil. The lead cleanup in West Oakland was completed as a removal action.

- ◆ **Cleanup Duration:** The cleanup began in the fall of 2011 and was completed in the summer of 2014. There was significant outreach done prior to the start of the cleanup. The actual removal lasted about 24 months, with 6 months of preparation prior to the removal and 6 months to close out the project after its completion.
- ◆ **Cleanup Level:** 400 ppm
- ◆ **Number of properties cleaned up:** During the removal, just under 300 yards were cleaned up.
- ◆ **Lead levels prior to cleanup:** The highest lead levels seen were around 3000 ppm, with the average being about 800 ppm.
- ◆ **Total Cost:** \$7.5 million, plus \$3.5 million in EPA indirect costs
- ◆ **EPA Contact:** Steve Calanog, [calanog.steve@epa.gov](mailto:calanog.steve@epa.gov)
- ◆ **Site Page:** <https://www.epaossc.org/WOaklandPb>

- ◆ **Cleanup Duration:** The cleanup is ongoing. Two work seasons (2-3 months each, in 2013 and 2014) have been completed. The work is planned to be completed over 5 years due to limited accessibility in winter months. Cleanup can only be completed from April to October.
- ◆ **Cleanup Level:** 400 ppm
- ◆ **Number of properties cleaned up:** To date, 43 properties have been cleaned up. There will be over 200 residential yards addressed in total.
- ◆ **Lead levels prior to cleanup:** Concentrations of lead in excess of 3,000 ppm have been found at Eureka, with the highest levels up to 100,000 ppm. In addition, arsenic levels above 600 ppm and up to 32,000 ppm have been found.
- ◆ **Total Cost:** An Engineering Evaluation/Cost Analysis (EECA) completed in February, 2016 estimated the total cleanup cost to be approximately \$27 million. Approximately \$20 million of this cost is to clean up residential properties, with the remaining costs used to cover slag piles and clean up 4 hillsides that were the locations of former smelters.
- ◆ **EPA Contact:** Tom Dunkelman, [dunkelman.tom@epa.gov](mailto:dunkelman.tom@epa.gov)
- ◆ **Site Page:** <https://www.epaossc.org/eurekasmelter>





### Coeur D'Alene Basin/Bunker Hill Superfund Site, Idaho

The Coeur D'Alene Basin/Bunker Hill lead cleanup in northern Idaho was initially started using removal authority in a 21 square mile area around the Bunker Hill mining and metallurgical complex and was then expanded under the remedial process to encompass 130 river-miles in the Coeur D'Alene Basin. Site contamination originated from historic mining, ore-processing, and smelting operations in the area and includes several communities as well as rural and undeveloped areas. During the cleanup, EPA has removed soil up to one foot in depth on residential and commercial properties and installed a barrier fabric and clean fill. There is an institutional control program in place at the site that requires property owners whose properties were remediated to request a permit through the Panhandle Health District before performing any excavation on their property. Once the permit is acquired, homeowners receive instructions on how to properly dispose of contaminated soil. Soil repositories are available for property owner use. The Panhandle Health District receives funding from EPA and the State of Idaho to do annual blood lead testing in the communities where the cleanup has been performed.

- ◆ **Cleanup Duration:** The residential cleanup began in 1986 with removal actions through 1991. Records of Decision (RODs) were then issued in 1991, 1992 and 2002 to perform the remaining cleanup under remedial authority. Several ROD amendments and ESDs have also been issued. Cleanup of residential yards is ongoing and will likely last about two more years. Cleanup may continue for several years beyond that at additional properties where EPA has had difficulty gaining access.
- ◆ **Cleanup Level:** 700 ppm
- ◆ **Number of properties cleaned up:** To date, 7,000 residential and commercial properties have been cleaned up.
- ◆ **Lead levels prior to cleanup:** Most contaminated residential properties fall above 1000 ppm, with "typical" levels falling in the 3000-4000 ppm range.
- ◆ **Total Cost:** \$356 million (property remediation only)
- ◆ **EPA Contact:** Bill Adams [adams.bill@epa.gov](mailto:adams.bill@epa.gov)
- ◆ **Site Page:** <https://yosemite.epa.gov/R10/CLEANUP.NSF/sites/bh>

### Ruston north Tacoma Study Area, Commencement Bay/nearshore Tidelands Superfund Site, Washington

Fallout from smelter emissions contaminated an area over 300 square miles surrounding the Asarco Tacoma Smelter in Tacoma and Ruston, Washington. EPA has been the lead agency for the study area (approximately 1 square mile of highly contaminated properties surrounding the smelter). The Washington State Department of Ecology has the lead for the remaining, less contaminated areas. Asarco performed the yard remediation until their bankruptcy, after which EPA completed the project using Recovery Act and settlement monies.

- ◆ **Cleanup Duration:** The residential cleanup began in 1983 and was substantially completed by 2014. In 2014 EPA entered a Cooperative Agreement with the Washington State Department of Ecology to complete any additional properties that were discovered or which previously had sampling or remediation refused.
- ◆ **Cleanup Level:** 500 ppm (and 230 ppm for arsenic)
- ◆ **Number of properties cleaned up:** To date, 2,700 residential lots, parks, and vacant parcels have been sampled, 1,987 have been remediated. 941 right of way parcels have been sampled and 452 have been remediated.
- ◆ **Lead levels prior to cleanup:** Most contaminated residential properties fall in the 250-1000 ppm arsenic and 500-1000 ppm lead.
- ◆ **Total Cost:** Because the work was mainly done by Asarco, the total cost is unknown, but was probably \$50 to \$100 million. Remediation cost per property was approximately \$25,000-\$50,000.
- ◆ **EPA Contact:** Kevin Rochlin, [rochlin.kevin@epa.gov](mailto:rochlin.kevin@epa.gov)
- ◆ **Site Page:** <https://yosemite.epa.gov/R10/CLEANUP.NSF/sites/Asarco>